3D Structure of Gold Nanoparticles

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Metal nanoparticles have important applications ranging from catalysis to optics. Most of these applications depend on the shape, size and surface structure of these nanoparticles. We show that EXAFS can be used to characterize these particles, yielding specific information about their structures. In particular, we demonstrate that 13-atom nanoparticles with thiol ligands can be synthesized in either icosahedral or FCC forms, and that the electronic properties of these forms differ. We also show how EXAFS analysis may be used to understand the shapes of larger particles on supports.